BAROMETRIC FACTOR AT BOTH SIDES OF THE GIBRALTAR STRAIT; ITS RELATION SHIP WITH INFLOW VARIATIONS

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ABSTRACT.- Atlantic inflow variations through the Strait has been evaluated from the barometric factor at both sides of the strait, calculated from atmospheric pressure and tide records. There is a high correlation between pressure and mean sea level at frequency bands related to the passages of atmospheric system. Likewise, a higher barometric factor in observed in the S. side y of the Strait.

RESUME.- Il est bien connu que les variations de la pression atmosphérique à la Méditerranée Occidentale produisent des variations dans l'"inflow" atlantique à travers du détroit de Gibraltar. Ces variations peuvent être évaluées si on dispose des enregistrements de la préssion atmosphérique locale de cette zone au moyen du comportement du facteur barométrique dans les deux bords du détroit.

Il y a une grande correlation entre la préssion atmosphérique et le niveau moyen de l'eau de la mer en bandes spécifiques de fréquances, les mêmes des passages des systèmes atmosphériques sur la zone.

Par ailleurs on observe la plus grande valeur du facteur barometrique dans la côte du Maroc, limite meridionel du détroit.

A high pressure over the W Mediterranean push down the water, diminishing the inflow and viceversa. The barometric factor ($b=\frac{\partial \zeta}{\partial p}$, ζ= m.sea level, p= atm.pres.(1)) should give explanation to explain the phenomenon. The mathematical model was built integrating (1) at bothe sides of the Strait and finding $\Delta\zeta=\Delta\zeta m+\Delta\zeta$ (the difference of ζ at both sides) which has two terms, one dependes of water density differences and the other one of p. The mean velocity of the flow is proportional

to $(\Delta\zeta)^{1/2}$. So if $|b_M| < |b_A|$ then $(b_A - b_M) < 0$, the flow decrease ($\Delta\zeta_p < 0$) if there is a high (opposite if there is low).

To calculated b spectral and lineal regression analysis were used for 5 years series in Málaga, Cádiz & Ceuta. From the first $|b_A - b_M| \simeq .2$ cm/mb with a high explained variation and coherency (phase 180°) at 3 and 8 days periods. From linear regression $|b_A - b_M| \simeq .3$ cm/mb. In Ceuta $b \simeq -1$ cm/mb, high value explained by the cross-strait geostrophy.

If we assume that mean velocities and inflows are directly related, a table can be made for the different values of ζ, b and p. In the most extreme conditions the flow can increase by 2.4. For normal changes a factor of 1.4 is more adequate.

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